



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/801,773	03/09/2001	Osamu Kuroda	Q61192	4550

7590 04/21/2003

SUGHRUE, MION, ZINN, MACPEAK & SEAS, PLLC
2100 Pennsylvania Avenue, N.W.
Washington, DC 20037-3202

EXAMINER

LEE, SHUN K

ART UNIT

PAPER NUMBER

2878

DATE MAILED: 04/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/801,773

Applicant(s)

KURODA ET AL.

Examiner

Shun Lee

Art Unit

2878

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 3 February 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2,3 and 5-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11 is/are allowed.
- 6) ☒ Claim(s) 2,3,5,6,8-10 and 12-15 is/are rejected.
- 7) ☒ Claim(s) 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: the paragraph beginning on pg. 19, line 10 have been amended to change "Fig. 12" to -Fig. 9- which is inconsistent with the specification (see Figs. 12 and 13 and brief description of Figs. 12 and 13 on pg. 10). Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 15 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 15 recites the limitation "said low density region comprises increased light emissions of a storable phosphor" which was not described in the specification.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 15 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Art Unit: 2878

6. The term "increased" in claim 15 is a relative term which renders the claim indefinite. The term "increased" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is unclear from the claim (and the specification; see 35 U.S.C. 112, first paragraph discussed above) what the light emissions is increased relative to.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Newman *et al.* (US 5,420,441).

In regard to claim **10**, Newman *et al.* disclose (column 7, lines 42-47; Fig. 6) a storable fluorescent inspection sheet (106) having stored and recorded a radiation inspection image (e.g., having a rectangular shape; see Fig. 11) that has a density pattern in which one or more low-density and high-density regions having a contrast difference of at least 1:20 (*i.e.*, cascading six lead masks with each 0.05 mm lead layer resulting in a roughly 30% x-ray modulation depth; column 6, lines 54-66; thus providing transmissions ranging from 1 to 0.03; column 8, lines 39-40) are arrayed in a horizontal scanning direction. The storable fluorescent inspection sheet of Newman *et al.* lacks an explicit description of a contrast difference of at least 1:50. However, Newman *et al.* also disclose (column 1, lines 49-53) that it is desirable for the method to provide analysis of the exposure latitude and photometric response linearity over the 10,000:1 dynamic range of a storage phosphor. Newman *et al.* further teach (column 2, lines 28-46; Fig. 6) that a special test target (104) is used to expose a storage phosphor cassette (*i.e.*, the storable fluorescent inspection sheet 106) which is then read and analyzed. Therefore it would be obvious to one of ordinary skill to provide a special test target having a 1:10,000 contrast difference for exposing the storage phosphor cassette (*i.e.*, the storable fluorescent inspection sheet) of Newman *et al.*, in order to analyze the storable fluorescent inspection sheet having a 1:10,000 contrast difference radiation inspection image stored therein for determining scanner performance (e.g., exposure latitude and photometric response linearity) over a 10,000:1 storage phosphor dynamic range.

In regard to claim 9, Newman *et al.* is applied as in claim 10 above.

Newman *et al.* also disclose (column 1, line 13 to column 2, line 16) a method of inspecting influence of stray light (*i.e.*, scatter or flare artifacts) which occurs in a radiation image reader equipped with horizontal scanning means for scanning excitation light on a storable fluorescent sheet, having stored and recorded a radiation image, in a horizontal scanning direction, vertical scanning means for scanning said storable fluorescent sheet in a vertical scanning direction approximately perpendicular to said horizontal scanning direction, and reading means for obtaining an image signal which represents said radiation image by photoelectrically reading said radiation image, stored and recorded in said storable fluorescent sheet, by the horizontal scanning of said excitation light; said inspection method comprising the steps of:

- (a) preparing (column 2, lines 52-55) a storable fluorescent inspection sheet that has stored and recorded a radiation inspection image which has a density pattern in which one or more low-density and high-density regions having a contrast difference arrayed in said horizontal scanning direction;
- (b) obtaining (column 2, lines 56-58) an image inspection signal representing said radiation inspection image, by photoelectrically reading said radiation inspection image from said storable fluorescent inspection sheet with said reading means; and
- (c) inspecting (column 2, lines 59-60) said influence of stray light, based on an image reproduced from said image inspection signal.

Art Unit: 2878

10. Claims 2, 3, 5, 6, 8, and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Newman *et al.* (US 5,420,441) in view of Farrokhnia *et al.* (US 6,231,231).

In regard to claims 2, 3, and 12, Newman *et al.* is applied as in claims 9 and 10 above. The method of Newman *et al.* lacks that in said radiation inspection image, a straight boundary line between said low-density and high-density regions is inclined (e.g., on a diagonal) with respect to said horizontal scanning direction so that it intersects both edges of said radiation inspection image which extend in said vertical scanning direction and that said density pattern in said radiation inspection image includes two high-density regions and one low-density region, said regions being arrayed in said horizontal scanning direction in the order of one high-density region, the low-density region, and the other high-density region. Test targets are well known in the art. For example, Farrokhnia *et al.* teach (column 7, lines 44-58) to provide a straight boundary line between low-density and high-density regions inclined with respect to horizontal scanning direction in order to determine both horizontal and vertical MTF in an x-ray system. Therefore it would be obvious to one of ordinary skill to provide a straight boundary line (e.g., on an image diagonal) in the method of Newman *et al.*, in order to determine a plurality of horizontal and vertical MTF along a line from one radiation inspection image edge to an opposing radiation inspection image edge.

In regard to claims 5 and 6, Newman *et al.* is applied as in claim 10 above. In addition, Newman *et al.* in view of Farrokhnia *et al.* is applied as in claims 2 and 3 above.

In regard to claims **8** and **14** which are dependent on either claim 5 or claim 6, Newman *et al.* disclose (column 6, lines 57-63; column 7, lines 42-47; Fig. 6) disposing a radiation transmittable member (104) at a position corresponding to said density pattern on a storable fluorescent sheet (106), the radiation transmittable member (104) having a radiation transmission factor which corresponds to said contrast difference; and storing and recording said radiation inspection image in said storable fluorescent sheet (106), by illuminating said storable fluorescent sheet (106), on which said radiation transmittable member (104) has been disposed, with a dose of radiation that corresponds to said contrast difference (*i.e.*, single photographing).

In regard to claim **13** which is dependent on claim 8, the method of Newman *et al.* lacks that the radiation transmittable member partially overlaps said storable fluorescent inspection sheet. However, Newman *et al.* also disclose that there exists clear regions (*e.g.*, 4 in Fig. 5) which are used for certain analysis (*e.g.*, FFT; column 7, lines 15-18). Therefore it would be obvious to one of ordinary skill to provide a radiation transmittable member partially overlaps said storable fluorescent inspection sheet in the method of Newman *et al.*, in order to obtain a plurality of clear areas (*e.g.*, a region where the radiation transmittable member does not overlap the storable fluorescent inspection sheet) for analysis of regions where unattenuated incident radiation has been recorded.

Allowable Subject Matter

11. Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. Claim 11 is allowed.

13. The following is a statement of reasons for the indication of allowable subject matter: the instant application is deemed to be directed to a nonobvious improvement over the invention patented in US Patent 5,420,441. The improvement comprises in combination with other recited elements, repeating the disposition of a radiation shielding member on a storable fluorescent sheet and the illumination with a radiation dose that corresponds to a contrast difference, until a density pattern is obtained.

Response to Arguments

14. Applicant's arguments filed 3 February 2003 have been fully considered but they are not persuasive.

Applicant argues (third paragraph on pg. 4 to fourth paragraph on pg. 5 of remarks filed 3 February 2003) that the storage sheet cannot be used to disclose a contrast difference of at least 1:50 since the analysis of the exposure latitude and photometric response linearity has nothing to do with the contrast of low and high density areas. Examiner respectfully disagrees. Newman *et al.* state (column 6, lines 37-52) that "The procedure developed to perform this task is based on exposing (FIG. 6) a special test target (FIGS. 4 and 5), scanning the resulting test target storage phosphor radiography image, and analyzing the result with a computer algorithm. The diagnostic image quality performance of a storage phosphor reader can be directly inferred by analyzing the following performance attributes of the scanner.

Art Unit: 2878

1) Exposure latitude and linearity ... 3) Spatial resolution (MTF) ... 7) Flare light artifacts" and further (column 1, lines 49-51) that "It is also desirable that the technique provide analysis of the following.

1) Exposure latitude and photometric response linearity over the 10,000:1 dynamic range of the storage phosphor". Thus it is clear that Newman *et al.* teach it is also desirable to use a special test target for the analysis of scanner exposure latitude and linearity performance over a 10,000:1 dynamic range of a storage phosphor. Note that the special test target is used to expose a storage phosphor cassette (*i.e.*, a storable fluorescent inspection sheet) which is then read and analyzed (see for example, column 2, lines 28-46). Therefore it would be obvious to one of ordinary skill to provide a special test target having a 1:10,000 contrast difference for exposing the storage phosphor cassette (*i.e.*, the storable fluorescent inspection sheet) of Newman *et al.*, in order to analyze the storable fluorescent inspection sheet having a 1:10,000 contrast difference radiation inspection image stored therein for determining scanner performance (*e.g.*, exposure latitude and photometric response linearity) over a 10,000:1 storage phosphor dynamic range.

Applicant argues (last paragraph on pg. 5 of remarks filed 3 February 2003) that Newman *et al.* and Farrokhnia *et al.* are not combinable and that Farrokhnia *et al.* appear to teach away from a straight line that intersects two edges of an inspection image. Examiner respectfully disagrees. Newman *et al.* state (column 6, lines 37-52) that "The procedure developed to perform this task is based on exposing (FIG. 6) a special test target (FIGS. 4 and 5), scanning the resulting test target storage phosphor radiography image, and analyzing the result with a computer algorithm. The diagnostic image quality performance of a storage phosphor reader can be directly inferred by analyzing the following performance attributes of the scanner. ... 3) Spatial resolution (MTF) ... ". Farrokhnia *et al.* state (column 6, lines 37-52) that "However, in

Art Unit: 2878

the coupon sub-phantom 370, the coupon edges 1410 have been rotated 5 degrees with respect to the coupon sub-phantom 370. The coupon edges 1410 thus provides both vertical and horizontal variation, The horizontal and vertical variation allow the computation of both the horizontal MTF and vertical MTF of the x-ray system. The amount of rotation of the coupon 375 is related to the resolution of the x-ray system in terms of pixel size as well as the size of the coupon 375. Additionally, rotating the coupon 375 assists in the measurement of the MTF because the edges of the coupon 375 do not align with a pixel column. For many commercially available systems, a rotation of approximately 5 degrees may be the most desired rotation although other rotations may also provide accurate MTF determination". Thus

Newman *et al.* teaches that the method should determine spatial resolution (*i.e.*, MTF) whereas Farrokhnia *et al.* teaches that a rotated coupon edge allow simultaneous determination of both horizontal MTF and vertical MTF. Therefore it would be obvious to one of ordinary skill to provide a straight boundary line (*e.g.*, a low-density line in a high-density region extending to the radiation inspection image edge) in the method of Newman *et al.*, in order to determine a plurality of horizontal and vertical MTF from one radiation inspection image edge to an opposing radiation inspection image edge.

Applicant argues (last paragraph on pg. 6 of remarks filed 3 February 2003) that the test target 104 was also cited as the storable fluorescent sheet. It should be noted that test target 104 in Fig. 6 was never cited as a storage phosphor sheet. In the previous office action (see pg. 3), it was stated that "preparing (column 2, lines 52-55) a storable fluorescent inspection sheet that has stored and recorded a radiation inspection image which has a density pattern in which one or more low-density and high-density regions having a contrast difference of at least 1:20 (*i.e.*, cascading six lead masks with each 0.05 mm lead layer resulting in a roughly 30% x-ray modulation depth; column 6, lines 54-66; thus providing transmissions ranging from 1 to 0.03; column 8, lines 39-40) are arrayed in said horizontal scanning direction". Further, column 2, lines 52-55 of

Art Unit: 2878

Newman *et al.* state that "exposing to x-rays a storage phosphor through a lead mask test target having a plurality of calibrated density regions useful in analyzing x-ray image characteristics and storage phosphor reader characteristics". Thus it is clear that the storable fluorescent inspection sheet of Newman *et al.* was prepared (with citation of column 2, lines 52-55) by exposing to x-rays a storage phosphor through a lead mask test target having a plurality of calibrated density regions and that radiation inspection image contrast differences of at least 1:20 was obtained via cascading six lead masks with each 0.05 mm lead layer resulting in a roughly 30% x-ray modulation depth thus providing transmissions ranging from 1 to 0.03 (with citations of column 6, lines 54-66 and column 8, lines 39-40).

In response to applicant's argument (last paragraph on pg. 6 of remarks filed 3 February 2003) that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (*i.e.*, the radiation transmittable member does not cover the entire storage sheet) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Art Unit: 2878


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (703) 308-4860. The examiner can normally be reached on Tuesday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (703) 308-4852. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

SL
April 15, 2003


DAVID PORTA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800